Plenary Session II
5/16/96

DS 1 Overview

David Lehman, Flight Team Manager

Presentation given by Robert Metzger

Deep Space Two (DS-2) Overview

Sarah Gavit, Flight Team Manager

Presentation given by Barbara Wilson

New Millennium Program Office

N M P

Deep Space Mission 2

MARS MICROPROBE MISSION

Sarah Gavit

Mission Objectives

- Demonstrate key technologies which enable future network science missions
- Demonstrate a non-ablative atmospheric entry
- Demonstrate highly integrated microelectronics which can withstand low temperatures and high decelerations, and
- Demonstrate in-situ, subsurface, science data acquisition and analysis

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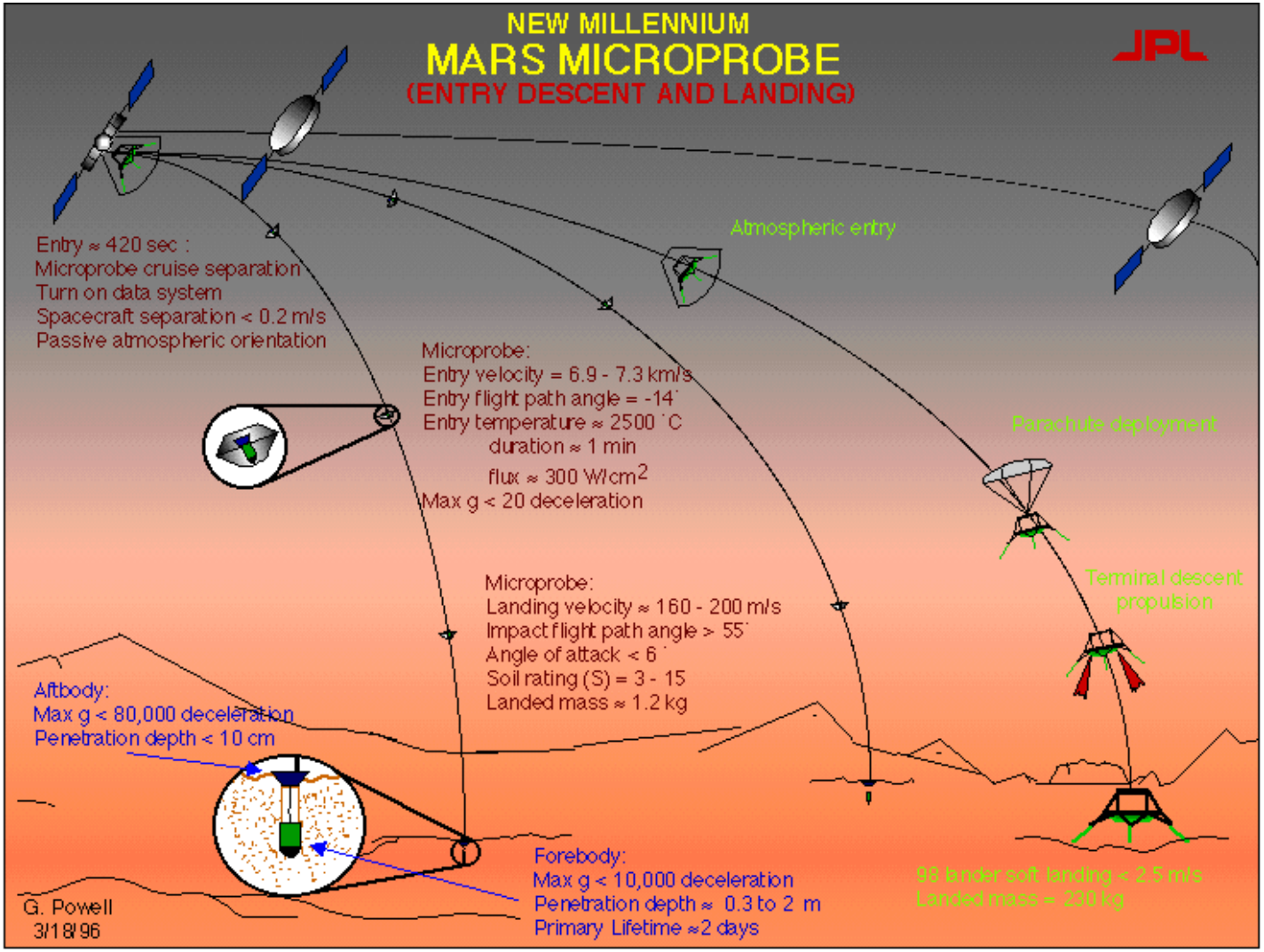
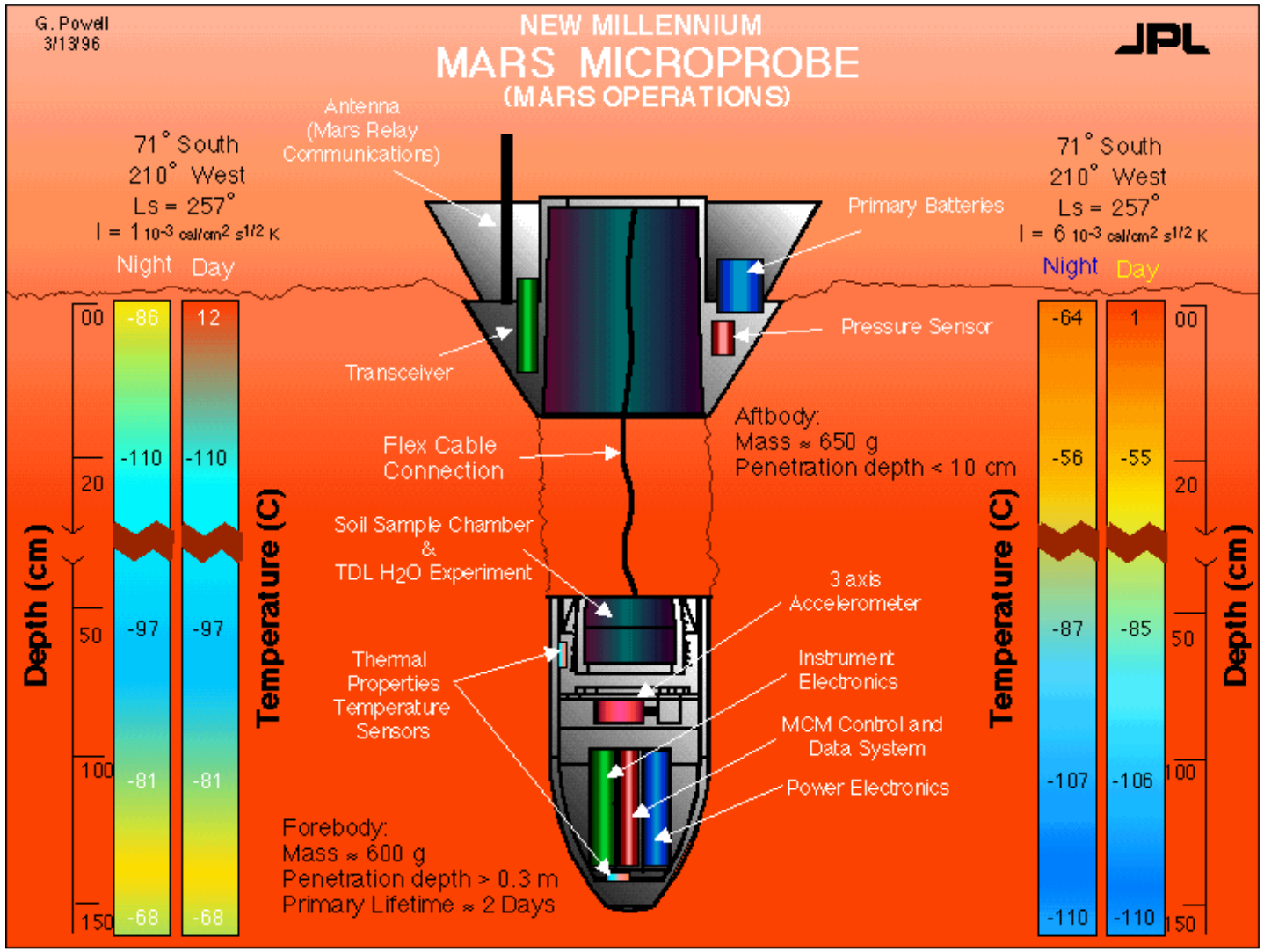
Mission Highlights

- Launch January 1999; Arrive: December 1999
- Two 4 kg probe systems mounted on 1998 Mars Surveyor Lander spacecraft
- Single-state Mars entry, descent and landing
- Landing ellipse centered at 70 degrees south latitude on polar deposits within several hundred kilometers of Mars '98 Lander
- Prime mission (50 hours): Verification of technologies, including collection and transmission of atmospheric and impact accelerometer data, soil sample and geochemistry data, meteorological pressure sensor data, and soil conductance temperature data
- Extended mission (goal 2 weeks): Continue collection and transmission of pressure and temperature data


NEW MILLENNIUM
MARS MICROPROBE
(ENTRY DESCENT AND LANDING)
JPL
Entry ≈ 420 sec :
Microprobe cruise separation
Turn on data system
Spacecraft separation < 0.2 m/s
Passive atmospheric orientation
Atmospheric entry
Microprobe:
Entry velocity = 6.9 - 7.3 km/s
Entry flight path angle = -14°
Entry temperature ≈ 2500 °C
duration ≈ 1 min
flux ≈ 300 W/cm2
Max g < 20 deceleration
Parachute deployment
Terminal descent propulsion
Microprobe:
Landing velocity ≈ 160 - 200 m/s
Impact flight path angle > 55°
Angle of attack < 6°
Soil rating (S) = 3 - 15
Landed mass ≈ 1.2 kg
Aftbody:
Max g < 80,000 deceleration
Penetration depth < 10 cm
Forebody:
Max g < 10,000 deceleration
Penetration depth ≈ 0.3 to 2 m
Primary Lifetime ≈2 days
98 lander soft landing < 2.5 m/s
Landed mass = 230 kg
G. Powell
3/18/96


G. Powell
3/13/96
NEW MILLENNIUM
MARS MICROPROBE
(MARS OPERATIONS)
JPL
Antenna
(Mars Relay
Communications)
71° South
210° West
Ls = 257°
I = 1 10-3 cal/cm2 s1/2 K
Night Day
71° South
210° West
Ls = 257°
I = 6 10-3 cal/cm2 s1/2 K
Night Day
Primary Batteries
Pressure Sensor
Transceiver
Aftbody:
Mass ≈ 650 g
Penetration depth < 10 cm
Flex Cable
Connection
Soil Sample Chamber
&
TDL H2O Experiment
3 axis
Accelerometer
Thermal
Properties
Temperature
Sensors
Instrument
Electronics
MCM Control and
Data System
Power Electronics
Forebody:
Mass ≈ 600 g
Penetration depth > 0.3 m
Primary Lifetime ≈ 2 Days
Depth (cm)
00
20
50
100
150
Temperature (C)
-86
-110
-97
-81
-68
12
-110
-97
-81
-68
Temperature (C)
-64
-56
-87
-107
-110
1
-55
-85
-106
-110
Depth (cm)
00
20
50
100
150

New Millennium Program Office

Technology Demonstrations

Technology	Lead
Non-ablative, single-stage-entry aeroshell	Program Office
Microtelecommunications system with programmable transceiver	Telecommunications IPDT
Power microelectronics with mixed digital/analog ASICs	Microelectronics IPDT
Ultra low temperature lithium battery	Modular Architectures & Structures IPDT
Microcontroller	Microelectronics IPDT
Flexible interconnects for system cabling	Modular Architectures & Structures IPDT
Meteorological high-g pressure sensor	Program Office
Soil conductance high-g temperature sensor	Program Office
Sample / Water Experiment	In-situ and Microelectromechanical Systems IPDT